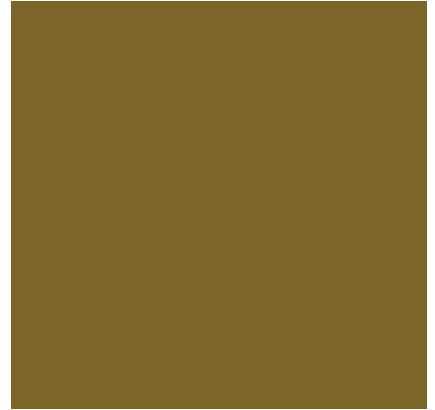




UNIVERSITY OF  
SASKATCHEWAN



# Smart Purchases Big Impact

**Sustainable Purchasing Guide**  
**Hand Cleaners**

*Sustainability... your university, your world*





## Introduction

This section provides information on currently available options for **hand cleaners** that can help to move the University of Saskatchewan toward its sustainability goals. Living within the boundaries of our sustainability objectives requires us to apply two main strategies:

**Dematerialization** requires that we reduce the amount of materials as much as possible; and that we continually move toward the use of 100% recycled content.

**Substitution** requires that we find less harmful materials to replace those that currently damage and are not recyclable.

**Sustainable purchasing** is about including social, environmental, financial and performance factors in a systematic way. It involves thinking about the reasons for using the product (the service) and assessing how these services could be best met. If a product is needed, sustainable purchasing involves considering how products are made, what they are made of, where they come from and how they will be used and disposed.

Finally, remember that this is an evolving document – it will change with new information as our understanding of sustainability impacts and potential solutions improves.

### Purchasing Services

Tel: (306) 966-6704  
Email: [purchasing.services@usask.ca](mailto:purchasing.services@usask.ca)

### Office of Sustainability

Tel: (306) 966-1236  
Email: [fmd.sustainability@usask.ca](mailto:fmd.sustainability@usask.ca)

**Smart Purchases  
Big Impact**

Wherever possible **CHOOSE** products that employ a combination of characteristics listed in the left hand column, and **AVOID** products that demonstrate characteristic in the right-hand column.

### CHOOSE

- EcoLogo or Green Seal certified products
- Biocompatibility
- food grade dyes and approved fragrances
- Strict toxicity limits

### AVOID

- Alkylphenoethoxylate surfants
- Toxic chemicals
- Volatile organic compounds

### OPTION: Choose EcoLogo or Green Seal certified products

**Strategy: Dematerialization and substitution – less waste; nature-like**

EcoLogo establishes strict limits on toxicity, VOCs, and resources used. The net environmental benefits are reductions in human health impacts, improved use of resources, less potential for smog formation and diminished aquatic toxicity.

Green Seal provides scientifically based third-party certifications for “environmentally preferable” products, facilities and services. The Green Seal standard relies on a life-cycle approach that tests and evaluates the entire process of a product’s creation and disposal to ensure that little to no harm is being done to the environment.

### OPTION: Choose Biocompatible Products

**Strategy: Substitution – less waste; nature-like**

Products that are “biodegradable” break down into pieces. In contrast, “biocompatible” means that the pieces are either beneficial or inert to the environment. Biocompatibility varies with the environment. Some products that are biodegradable may still be harmful to the environment, so it is important to verify the biocompatibility of the ingredients.

Generally, cleaners derived from vegetable-based fatty acids break down more easily than those derived from petrochemical-based fatty acids.

### OPTION: Choose Products with No or Low VOCs

**Strategy: Substitution and dematerialization**

Choose a product that does not contain more than 1% by weight of volatile organic compounds. A hand cleaner with more than 8% VOCs is labelled as an Industrial Hand Cleaner.

The production and use of solvent-based and, to a lesser extent, water-based consumer products that result in the emission of VOCs diminish air quality and contribute to air pollution. Precursor substances such as VOCs along with nitrogen oxides (NOx) are involved in a series of complex photochemical reactions that result in the formation of ground-level ozone (O3), which is a respiratory irritant and one of the major components of smog. Smog is a noxious mixture of air pollutants, consisting primarily of ground-level ozone and particulate matter (PM) that can often be seen as a haze over urban centres. Air pollution has been shown to have a significant adverse impact on human health, including premature deaths, hospital admissions and emergency room visits.



### Option: Use Products that do not Contain EDTA/NTA/Phosphate

**Strategy: Substitution – Nature-like / More Abundant (SO 1, 2)**

EDTA (SO<sub>2</sub>), NTA (SO<sub>2</sub>), and phosphates are often used in cleaners as binders. If they are allowed to systematically increase in nature, they have negative impacts such as eutrophication of lakes (from phosphates) and cancer (from EDTA / NTA). Where possible, choose products that do not contain any of these substances.

Alternatives include sodium carbonate, sodium bicarbonate, sodium citrate and sodium silicate.

### Option: Avoid Products that Contain APEs (alkylphenol ethoxylates)

**Strategy: Substitution – Nature-like (SO 2)**

APEs are the most common family of surfactants used in cleaners. In an environment without oxygen, APEs may break down into compounds that are persistent and accumulate (alkyl phenols). When shopping for cleaning products, avoid those with APEs.

However, consult with the manufacturer of the alternative products to ensure the substitute surfactant is also not a substance that is persistent and accumulates.

One common substitute for APEs is linear alcohol ethoxylates (LAEs). LAEs are considered less persistent than APEs and are not harmful unless they are in high concentrations.

### OPTION: Choose Food Grade Dyes and Approved Fragrances

**Strategy: Substitution**

To lessen impact on the environment, a product should be chosen if it is shown to contain only food grade dyes. As well, products should contain only fragrances manufactured under the Code of Practice of the International Fragrance Association. IFRA is involved with research and development, scientific findings, health and safety concerns as well as environmental protection. The IFRA Standards define safe use levels of individual fragrance ingredients.

## Arriving at the currently preferred options

### 1. Identify the service

Hand cleaners are used to clean and disinfect the hands.

### 2. Assess the need

The University of Saskatchewan requires hand cleaners to ensure that students, staff and faculty can clean their hands to support health and safety for all individuals on campus.

### 3. Identify the contents

There are many components in hand cleaners, including abrasives, antimicrobial agents, colorants, fragrances and preservatives. Hand cleaners may also contain a number of other ingredients depending on their specific purpose.

Hand cleaners may contain harmful ingredients such as petroleum solvents, d-limonene, alcohols, phenol ethoxylates, phosphates, silicates, nitrates, EDTA (ethylene diaminetetra-acetic), NTA (nitrilotriacetic acid), mineral acids, and caustic or butyl cellosolve. These ingredients contain irritating substances, as well as volatile organic compounds (VOCs), non-biodegradable surfactants, chelating compounds and toxic chemicals.

### 4. Identify sustainability impacts

*i. ....systematically increasing concentrations of substances from the earth's crust?*

- The extraction of raw materials, production and transportation of cleaners requires the use of energy. The majority of energy used for industrial purposes is produced with fossil fuels.
- Some cleaners use petrochemical-based solvents as an ingredient. These solvents are made with fossil fuels extracted from the earth's crust.

*ii. ....systematically increasing concentrations of substances produced by society?*

- Many ingredients in cleaners are persistent compounds that do not easily biodegrade into nature-like substances.
- Alkylphenol ethoxylates (APEs) are a widely used group of surfactants in hand cleaners. APEs breakdown into products that are persistent and can bio-accumulate. They are also known endocrine disruptors and have been linked to the

*continued on page 3...*

feminization of fish.

#### 4. Identify sustainability impacts (cont'd)

- Other persistent compounds include volatile organic compounds (VOCs) from petrochemical-based solvents; VOCs contribute to poor indoor air quality and smog and EDTA and NTA are both suspected carcinogens.
- Man-made compounds are also released in the production of petrochemical-based solvents. For example, APEs are manufactured by reaction with ethylene oxide, a known carcinogen and relatively persistent compound. This process increases concentrations of ethylene oxide, harming human health and nature.
- Chlorine is often used in cleaners as a bleaching agent. When discharged into wastewater, chlorine can interact with other compounds to form chlorinated organic compounds (COCs), which are persistent in nature and increase in concentration. Some chlorinated organics are also known carcinogens.

iii. ...systematically degrading nature by physical means?

- The process of extracting, transporting and processing fossil fuels to produce petrochemicals and minerals physically disturbs large areas of land.

iv. ...systematically undermining people's ability to meet their basic human needs?

- Some compounds found in hand cleaning products are harmful to humans (e.g. APEs, VOCs), including suspected or known carcinogens. Poor indoor air quality is a major health concern. Since compounds cannot easily disperse indoors, concentrations of these substances are much higher than they would be outdoors.
- VOCs contribute to the formation of smog, which contributes to respiratory problems in humans. Some VOCs are also suspected or known carcinogens.
- Some hand cleaners have either a very high or very low pH level. In either case, they can cause burns to the skin. Hand cleaners with pH levels closer to 7.0 (the pH level of water) are safer, but can still cause skin and eye irritation.

#### 5. Envision sustainable small appliances

A sustainable society requires hand cleaners, so this product would exist and perform its cleaning function effectively. In principle, sustainable hand cleaning products would not contain synthetic (e.g. VOCs) or mined (e.g. phosphate) ingredients that cannot be assimilated by nature, unless they can be 100% captured and reused. In addition, producing and transporting the hand cleaners would be sustainable, not contributing to increasing concentrations of substances from the earth's crust or persistent chemical compounds in nature.

The energy used would be generated from sustainable and renewable sources in a carbon-neutral way, so that no carbon could escape and build up in the atmosphere. The production process would also avoid practices that systematically degrade land or that undermine the capacity of consumers, workers and others to be healthy and meet their needs. Hand cleaner would be used properly, according to instructions, and all possible components recycled.

In principle, sustainable cleaning products would not **contain** synthetic (e.g. VOCs) or mined (e.g. phosphate) ingredients that cannot be **assimilated by** nature, unless they can be 100% captured and reused.

The **energy** used would be generated from sustainable and renewable sources in a carbon-neutral way, so that no carbon could escape and build up in the atmosphere. The production process would also avoid practices that systematically degrade land or that undermine people's capacity to be healthy and meet their needs. This cleaning product would be **used** properly, according to instructions, and all possible components recycled.

#### 6. Identify and prioritize alternatives

Step 6 helps identify the product or service that offers the best pathway toward meeting all four of our Sustainability Objectives by using the following three criteria for assessment:

- Does the product or service move us in the right direction with regards to our four Sustainability Objectives?
- Does the product or service create a flexible platform for the next step toward sustainability?
- Is the decision financially viable?

## Resources and Additional Information

1. Volatile Organic Compound Concentrations  
[www.canadagazette.gc.ca/rp-pr/p1/2008/2008-04-26/html/reg3-eng.html](http://www.canadagazette.gc.ca/rp-pr/p1/2008/2008-04-26/html/reg3-eng.html)
2. Volatile Organic Compounds  
<http://www.epa.gov/iaq/voc.html>



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